# THE ONTARIO WATER RESOURCES COMMISSION

REPORT ON

# WATER POLLUTION SURVEY

OF THE

# ST. LAWRENCE RIVER

in the vicinity of

# IROQUOIS

with pertinent

# SANITARY SURVEY REPORT

ON

# VILLAGE OF IROQUOIS

DECEMBER 5th to 7th

1960

# INTERIM REPORT

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# VILLAGE OF IROQUOIS

by

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Supervised by

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District Engineer

DATE

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# WATER POLLUTION SURVEY

of the

# ST.LAWRENCE RIVER AT IROQUOIS

Index



Appendix

COUNTIES OF: Dundas
Grenville

## INTRODUCTION

Subsequent to a discussion held on November 23rd, 1960, between municipal officials of the Village of Iroquois and Dr.A.E.Berry of this Commission, investigations were conducted by Commission staff during the period of December 5th to 7th, 1960, to determine the extent of water pollution, if any, in the St.Lawrence River at Iroquois.

Accompanying the delegation from Iroquois was Dr.P.S. deGrosbois, M.O.H. and Director, Stormont, Dundas and Glengarry Health Unit,who reportedthat the bacteriological results of samples collected from the St.Lawrence River at Iroquois by his staff during recent months had indicated the presence of high coliform counts in that watercourse. In view of the high coliform counts revealed along the riverfront at Iroquois, Dr.deGrosbois reported that he had no alternative but to placard the bathing beach at Iroquois, advising the public that the waters were unsafe for bathing purposes.

This recent survey was the first of a series of investigations which may be necessary in order to provide a conclusive explanation of the adverse bacteriological quality of samples collected by the local health unit staff.

A previous survey had been conducted by Commission staff during the period of May 31st to June 2nd, 1960, and had included sampling of the St.Lawrence River water from Cardinal to Morrisburg, and was pertinent to the incorporated

municipalities of Cardinal, Iroquois, and Morrisburg, which employ the St.Lawrence River as a source of municipal water supply and as a receiving water for the effluents from their municipal sewage treatment plants. The laboratory analyses of the samples collected on June 1st and June 2nd, 1960, had revealed that the sanitary chemical and bacteriological qualities of these waters were within acceptable limits at the time of sampling.

In conjunction with the collection of samples from the St.Lawrence River and the Galpp Canal on December 6th and 7th, 1960, a partial municipal sanitary survey was conducted at Iroquois in order to determine the sources and qualities of flows discharging therefrom to the St.Lawrence River.

GENERAL

The co-operation which was received from the various officials as listed below, and from other persons interviewed during these investigations, is appreciated:

Village of Iroquois

Mr.L.C.Davis, Reeve;

Mrs.M.E.Casselman, Clerk;

Mr.P.J.Pope, Operator of the Municipal Water Works and Sewage Works;

Ontario H.E.P.C.

Mr.K.Henry, River Control Engineer, Cornwall;

Mr.G.Willows, Chief Construction Manager, Cornwall.

Stormont, Dundas and Glengarry Health Unit

Dr.P.S.deGrosbois, M.O.H. and Director;

Mr.R.Cameron, Sanitary Inspector.

An acknowledgement is made to the Iroquois officials for their assistance in providing a boat and operator for collecting samples.

SAMPLING PROGRAMME

"Grab" samples were collected from the St.Lawrence River and the Galop Canal at locations as shown on the appended map of the "St.Lawrence River from Cardinal to Iroquois". The locations of samples pertinent to discharges from Iroquois to the river are shown on the appended plan of the "Village of Iroquois".

SAMPLING PROCEDURE

Samples were collected: forty(40) ounce samples being used for sanitary chemical analysis, and six(6) ounce samples for bacteriological analysis. Tests were performed at the Ontario Water Resources Commission laboratory, Toronto. The laboratory results are appended to this report.

The most common analyses of sanitary significance are: Biochemical Oxygen Demand, Suspended Solids, and the coliform determination which for the purpose of this report, was obtained by the membrane filter technique and is reported as a Membrane Filter Coliform Count.

Biochemical Oxygen Demand(B.O.D.)

The B.O.D. of sewage, industrial wastes or polluted

waters, is the oxygen required during stabilization (natural purification in a stream) of the decomposable organic matter or chemical material by aerobic biochemical action. Unless otherwise noted, a five-day B.O.D. determination is reported. A high B.O.D. is indicative of organic or chemical pollution. A desirable upper limit in natural water normally is four(4) parts per million.

Suspended Solids

These results are reported in parts per million and indicate the measure of undissolved solids of organic or inorganic nature. Where suspended solids values approach 20 parts per million or less, laboratory difficulties usually result in these values being determined as turbidity and are reported in silica units.

Membrane Filter Coliform Count

The membrane filter technique is employed to obtain a direct enumeration of coliform organisms and is reported per 100 millilitres. Waters having a membrane filter coliform count in excess of the desirable upper limit of 2,400 organisms are considered undesirable for municipal water supplies and bathing purposes.

SAMPLING CONDITIONS

Sampling of the St.Lawrence River in the immediate vicinity of Iroquois was commenced on December 6th but was abandoned prior to completion due to the rough wave action

occurring on that day. The upstream samples were collected on the following day.

Information obtained privately from the CJSS Radio and Television Station in Cornwall revealed the following weather and wind conditions in the general area during the period of this survey:

| Date 1960 | Time of Sampling | Atmospheric Temperature | River Water Temp. | Precip-itation | Wind Direction | Wind Velocity (miles per hour) |
|---|---|---|---|---|---|---|
| Dec.6 | 10:30 a.m. to 12:30 p.m. | 55°F | 46°F | Nil | W | 14 to 17 |
| Dec.7 | 10:00 a.m. to 1:00 p.m. | 36°F | 46°F | light snow 0.25 inches of rain in p.m. | N.W. | 15 |

Current studies were not conducted during this survey, although they may be included in future repetitions thereof. H.E.P.C. officials at Cornwall provided a map showing the results of current studies made in the Iroquois beach area during 1958 by their staff. The paths followed by floats were indicated, and suggested that a portion of the waters flowing downstream from the Iroquois dam tend to swirl into the bathing beach area, following clockwise and contra-clockwise courses near the shore.

SAMPLING RESULTS

The laboratory results of the analyses of samples collected from the St.Lawrence River in the vicinity of Iroquois, and in the river and the Galop Canal upstream to Cardinal, revealed satisfactory conditions with respect to the sanitary chemical quality of these waters at the times of sampling. The coliform counts in the vicinity of Iroquois, and in the river and the Galop Canal as far upstream as the west limit of Dundas County, similarly were within acceptable limits. At sampling points numbered 42, 43, and 44, located in the Galop Canal a short distance downstream from Cardinal, and at sampling point number 48 located upstream from Cardinal's northern sewage treatment plant, coliform counts exceeded the upper limit of 2400 organisms per 100 ml. considered acceptable by this Commission.

SUMMARY

Generally, satisfactory conditions with respect to sanitary chemical quality and coliform content were revealed in the waters of the St.Lawrence River and the Galop Canal at Iroquois and thence upstream to Cardinal during this sampling programme. Coliform counts in excess of normally acceptable limits were revealed at sampling points numbered 42, 43, and 44, located in the Galop Canal near Cardinal.

RECOMMENDATIONS

This sampling programme should be continued during varying seasonal weather conditions in order to determine conclusively the sanitary chemical and bacteriological qualities of the St.Lawrence River water at Iroquois.

## MUNICIPAL SANITARY SURVEY OF IROQUOIS

In conjunction with the sampling of the local section of the St.Lawrence River, a limited municipal sanitary survey was made at Iroquois with respect to water supplies, sewage disposal and storm water disposal, as affecting the waters of the St.Lawrence River. These investigations were made to determine the source and significance of outfalls discharging to the watercourse. The locations of active and potential outfalls were noted for future reference, and are shown on the appended plan of the Village of Iroquois. The laboratory results of the samples collected are appended to this report.

### MUNICIPAL SANITARY SURVEY

The Village of Iroquois covers an area of 1,140 acres with an approximate population of 1,010 according to the 1960 Municipal Directory. This community was relocated in conjunction with the St.Lawrence Seaway development programme.

The water supply for Iroquois is drawn from the St.Lawrence River. A primary-type municipal sewage treatment plant provides treatment of the sewage flows from the community. Networks of municipal storm sewers have their outlets to the St.Lawrence River or its watershed.

### WATER WORKS

The village water supply is delivered by gravity from the St.Lawrence River through a single 16-inch diameter cast iron intake pipe to the intake well located under the floor of

the pumphouse. The intake crib is located approximately 1800 feet from the pumphouse in a depth of water approximating 40 to 50 feet. Treatment consists of screening and chlorination.

Water services in the village are not metered. The volume of water pumped daily approximates 400,000 Imperial gallons. The estimated demand for design purposes was 125,000 gallons per day for domestic use and 300,000 gallons per day for the one industry, Caldwell Linen Mills Limited.

Chlorination procedures at the pumphouse were reviewed on December 7th, 1960. Chlorine residual tests were performed, and revealed a free chlorine residual of 0.3 p.p.m. after 15 minutes contact between the chlorine and the raw water at a temperature of 78°F. A total chlorine residual of 0.5 p.p.m. was revealed 5 minutes after the application of orthotolidine. The Wallace and Tiernan series A-419 water diaphragm-vacuum type chlorinator was set to feed 3.25 pounds of chlorine per day while water was being pumped at an indicated rate of 240 gallons per minute, an apparent chlorine dosage of 0.9 p.p.m. The plant records revealed the use of 150 pounds of chlorine during a 48-day period when 15,867,900 gallons of water was recorded as being pumped, indicating a similar dosage of 0.9 p.p.m.

Samples of water were taken at the pumphouse during this inspection on December 7th, and the laboratory results are reported as follows:

| Lab. No. | Description of Sample | 5 Day B.O.D. p.p.m. | Turbidity Silica Uts. | Lab. No. | Total Coliforms/100ml. Mem. Filter | Grade |
|---|---|---|---|---|---|---|
| W2840 | Raw water from intake well at Iroquois water works | 5.6 | 1.0 | W10058 | 12 | C |
| -- | Chlorinated water at Iroquois water works | -- | -- | W10057 | 0 | A |

The B.O.D. value of 5.6 p.p.m. is greater than that obtained at all other stream sampling points. Its validity, therefore, is questioned.

A laboratory examination indicated that an application of 0.4 p.p.m. of chlorine would be required to produce a total chlorine residual of 0,3 p.p.m. in this water after 15 minutes contact at 20°C. This was the condition of the water at the laboratory and may differ slightly from the condition of the sampled water at the time of treatment at the plant.

The Iroquois water works and distribution system, with the exception of the fire hydrants, is supervised by the Iroquois Water Works Commission. The hydrants are the responsibility of the village council. Mr.G.L.Loucks is the water works superintendent.

SEWAGE WORKS

Before relocation, the Village of Iroquois was served by systems of sewers which conducted storm water and untreated sanitary waste flows to the St. Lawrence River. In conjunction with the construction of the St. Lawrence Seaway, municipal sewage works consisting of sanitary sewers, a sewage pumping station and a sewage treatment plant, were provided at Iroquois as part of the rehabilitation programme.

Domestic sewage from most of Iroquois discharges by gravity to the sewage pumping station located near Elizabeth Drive as shown on the appended plan of the village. The design pumping capacity of this station is 400 Imperial gallons per minute. The sewage is pumped thence through an 8-inch forcemain for a distance of 1800 feet to the 10-inch concrete gravity sewer which extends eastward along Lakeview Avenue to a point near Island Park Drive where the sewer increases in size to 14 inches and continues in a southerly direction to the sewage treatment plant. Sewage flows from the eastern part of the village discharge by gravity to the trunk sanitary sewer entering the sewage treatment plant.

Overloading of the sewage pumping station has occurred during the spring months and reportedly is, in part, attributed to the infiltration of ground waters into the sanitary sewers. During an inspection of these sewage works by Commission staff on June 1st, 1960, sewage was being pumped from a sewer manhole located in front of the sewage pumping station, and was being discharged in a southerly direction to the park land lying along the waterfront. This pumping reportedly was necessitated

by heavy rains occuring in the area. If these storm flows are delivered from the pumping station to the forcemain, flooding of basements in the area reportedly results owing to the limiting size of the gravity sewer receiving the flows from the forcemain. A 14-inch diameter overflow sewer is provided at the sewage pumping station and reportedly outfalls to the St.Lawrence River upstream from the municipal water works intake structure. There was no discharge in this overflow sewer during this recent survey.

Suspecting that the infiltration of ground waters into the sanitary sewers was excessive, the H.E.P.C. staff have commenced a programme of repairing breaks and defective connections in the sewer system. The entire asbestos cement sanitary sewer extending from the Caldwell Linen Mills Limited to the municipal system has been relaid. This sewer extends, in part, through a low-lying area where infiltration of ground water into defective piping could readily occur. The television camera technique has been employed to inspect the larger sewers and, where defects were revealed, immediate remedial action was taken. A small television camera reportedly will be used soon to inspect the smaller sewers.

During the repairing of the sanitary sewer on Elizabeth Drive during this survey, sewage was being pumped from the sewer and was ponding on the park land lying to the south.

The Iroquois sewage treatment plant is a primary-type treatment plant and was designed to treat the sanitary wastes for

a population of 1500 and the industrial waste from the one industry. The design flow was estimated at 100 Imperial gallons per capita per day and 300,000 Imperial gallons per day from the industry. From these flows the design plant capacity approximates 450,000 Imperial gallons per day. Instrumentation is not provided at this plant for measuring the volumes of the sewage flows.

The various sections of the plant include: bypass overflow weir, coarse bar screen, wet well and sewage pumps, storm and bypass forcemain, primary clarifier, chlorine contact chamber, outfall sewer, sludge digester, sludge drying beds, and sludge pumping equipment.

The 18-inch diameter asbestos cement gravity outfall sewer terminates at the shoreline downstream from the village. A 12-inch diameter force main outfall has been installed recently parallel to the gravity outfall sewer and is employed for pumping flows in excess of the plant capacity, which usually occur from mid-March to mid-April. Although the plant effluent normally is chlorinated, flows bypassed through the forcemain are not accorded chlorination. A Wallace and Tiernan gas chlorinator with a capacity of 25 pounds per day is provided at the plant. With the chlorinator set to feed 9 pounds of chlorine per 24 hours, only a trace of chlorine residual was revealed in the plant effluent during an inspection of this sewage treatment plant on December 6th, 1960.

Samples were collected from the influent and effluent at this plant on December 6th. The laboratory results of analyses

performed on these samples as well as from samples collected at identical locations by Commission staff on June 1st, 1960, are shown below:

| Location of Sample | Date of Sample 1960 | Lab. no. | 5 Day B.O.D. p.p.m. | Solids p.p.m. Tot. | Susp. | Diss. | Total Coliform Count per 100 ml. Mem. Filter |
|---|---|---|---|---|---|---|---|
| Influent to Iroquois S.T.P. | June 1 | 2246 | 115 | 556 | 90 | 466 | -- |
| | Dec. 6 | 7733 | 245 | 864 | 190 | 674 | 400,000 |
| Effl. from Iroquois S.T.P. | June 1 | 2248 | 24 | 504 | 56 | 448 | -- |
| | Dec. 1 | 7734 | 135 | 750 | 118 | 640 | 10,400,000 |

It may be observed that the sewage flows sampled on June 1st, 1960, were diluted by the ground waters infiltrating the sanitary sewer system at that time.

The results of the current studies conducted in the St. Lawrence River at Iroquois by the H.E.P.C. during 1958 indicate that the main eddies forming in the watercourse downstream from the control dam do not extend as far downstream as the municipal sewage treatment plant outfalls. The floats employed tended to veer towards the shore in the vicinity of sampling point #15 near the bathing beach, following clockwise and contra-clockwise courses. From these studies it is not apparent that discharges from the sewage treatment plant would be borne upstream to the water works intake.

STORM DRAINAGE

Systems of storm sewers and ditches serve Iroquois, and conduct storm flows to the St. Lawrence River. The locations of these outfalls are shown on the appended "Plan of the Village of Iroquois", and may be of assistance in conducting future repetitions of this survey.

Surface drainage flows were observed and sampled at one location only during this survey. An improved watercourse discharges to the St. Lawrence River near the eastern limit of the municipality and conducts storm water flows from Lakeview Avenue at a location near the Anglican Church. A sample was taken from the watercourse at sampling point #2W, and the laboratory results thereof are reported as follows:

| Date of Sample 1960 | Lab. No. | 5 Day B.O.D. p.p.m. | Total Solids p.p.m. | Turbidity Silica Units | Total Coliform Count per 100 ml. Membrane Filter |
|---|---|---|---|---|---|
| Dec.6 | 7732 | 2.3 | 174 | 1 | 68 |

The above results indicate satisfactory conditions in this improved watercourse at the time of sampling.

RECREATIONAL AREA

The location of the Iroquois bathing beach is shown on the "Plan of the Village of Iroquois". Of direct concern to the safety of the waters at this bathing beach is the potential overflow from the sewage pumping station to the river in this vicinity, and the occasional intentional discharge of sewage to the park land lying north of the bathing beach as described previously in this report.

## SUMMARY

In conjunction with a survey to determine the extent of water pollution, if any, in the St.Lawrence River at Iroquois, a municipal sanitary survey of that village was made during the period of December 5th to 7th, inclusive. Investigations and enquiries were made to determine the locations and sources of active and potential discharges from this village to the river.

Untreated sanitary wastes from Iroquois reportedly have gained access to the St.Lawrence River during periods of overloading at the sewage pumping station, and when excessive flows entering the sewage treatment plant have necessitated the use of the bypass arrangement and the force main. According to information obtained during this survey, it was apparent that the excessive flows which occur occasionally in the sewer system result, in part, from broken sewer piping and defective connections therein. The H.E.P.C. has launched a programme to locate and repair these defects. It is anticipated that these corrective measures will reduce substantially the surcharging of the sewer system which has occurred during the spring months and following periods of heavy precipitation.

The storm drain systems generally were devoid of flows during this survey.

## RECOMMENDATIONS

These investigations at Iroquois should be repeated under various seasonal weather conditions in conjunction with future re-sampling of the local section of the St.Lawrence River.

The H.E.P.C. should continue in their programme of sewer investigation and improvement so that the frequency of sewage bypassing and park land flooding can be minimized.

# RIVER SURVEY

Watercourse: St.Lawrence River

Date Sampled: Dec.6, 1960

All analyses except pH report in p.p.m. unless otherwise indicated.

| Sample Point No. | Lab. No. | 5 Day B.O.D. | Solids Total | Solids Susp. | Solids Diss. | Turbidity Silica Units | Bacteriological Laboratory Lab.No. | M.F.Coliform Count/100ml. |
|---|---|---|---|---|---|---|---|---|
| 1 | R4133 | 1.9 | 162 | | | 2 | R10018 | 163 |
| 2 | R4134 | 2.0 | 162 | | | 2 | R10019 | 91 |
| 3 | R4135 | 2.1 | 174 | | | 2 | R10020 | 31 |
| 4 | R4136 | 2.3 | 150 | | | 2 | R10021 | 59 |
| 5 | R4137 | 3.7 | 156 | | | 1 | R10022 | 67 |
| 6 | R4138 | 2.0 | 156 | | | 1 | R10023 | 70 |
| 7 | R4139 | 2.2 | 166 | | | 1 | R10024 | 51 |
| 8 | R4140 | 2.3 | 158 | | | 1 | R10025 | 41 |

| | | |
|---|---|---|
| 1 | R4133 | Downstream from Iroquois S.T.P. |
| 2 | R4134 | " " " " |
| 3 | R4135 | " " " " |
| 4 | R4136 | " " " " |
| 5 | R4137 | " " " " |
| 6 | R4138 | " " " " |
| 7 | R4139 | " " " " |
| 8 | R4140 | " " " " |

# RIVER SURVEY

Watercourse: St.Lawrence River

Date Sampled: Dec.6/60

All analyses except pH reported in p.p.m. unless otherwise indicated.

| Sample Point No. | Lab. No. | 5 Day B.O.D. | Solids Total | Solids Susp. | Solids Diss. | Turbidity Silica Units | Bacteriological Laboratory Lab.No. | Bacteriological Laboratory M.F.Coliform Count/100ml. |
|---|---|---|---|---|---|---|---|---|
| 9 | R4141 | 3.4 | 170 | | | 2 | R10026 | 400 |
| 10 | R4142 | 2.5 | 180 | | | 2 | R10027 | 1100 |
| 11 | R4143 | 2.3 | 168 | | | 2 | R10028 | 106 |
| 12 | R4144 | 2.5 | 164 | | | 1 | R10029 | 99 |
| 13 | R4145 | 2.3 | 166 | | | 2 | R10030 | 84 |
| 14 | R4146 | 2.1 | 194 | | | 3 | R10031 | 98 |
| 15 | R4147 | 2.4 | 160 | | | 1 | R10032 | 96 |
| 16 | R4148 | 1.9 | 168 | | | 2 | R10033 | 126 |

| | | |
|---|---|---|
| 9 | R4141 | Downstream from Iroquois S.T.P. |
| 10 | R4142 | " " " " |
| 11 | R4143 | " " " " |
| 12 | R4144 | Upstream from Iroquois S.T.P. |
| 13 | R4145 | " " " " |
| 14 | R4146 | " " " " |
| 15 | R4146 | " " " " |
| 16 | R4148 | " " " " |

## RIVER SURVEY

Watercourse: St.Lawrence River

Date Sampled: Dec.6/60

All analyses except pH reported in p.p.m. unless otherwise indicated.

| Sample Point No. | Lab. No. | 5 Day B.O.D. | Solids Total | Susp. | Diss. | Turbidity Silica Units | Lab.No. | M.F.Coliform Count/100ml. |
|---|---|---|---|---|---|---|---|---|
| 17 | R4149 | 2.6 | 170 | | | 1 | R10034 | 92 |
| 18 | R4150 | 2.6 | 170 | | | 2 | R10035 | 105 |
| 19 | R4151 | 2.4 | 168 | | | 1 | R10036 | 76 |
| 20 | R4152 | 2.3 | 156 | | | 1 | R10037 | 94 |
| 21 | R4153 | 2.3 | 166 | | | 1 | R10038 | 86 |
| 22 | R4154 | 2.3 | 168 | | | 1 | R10039 | 76 |
| 23 | R4155 | 2.4 | 174 | | | 1 | R10040 | 78 |
| 24 | R4156 | 2.3 | 172 | | | 1 | R10041 | 62 |

| | | |
|---|---|---|
| 17 | R4149 | Upstream from Iroquois S.T.P. |
| 18 | R4150 | " " " " |
| 19 | R4151 | " " " " |
| 20 | R4152 | " " " " |
| 21 | R4153 | " " " " |
| 22 | R4154 | " " " " |
| 23 | R4155 | " " " " |
| 24 | R4156 | " " " " |

## RIVER SURVEY

Water course: St.Lawrence River

Date Sampled: Dec.6/60

All analyses except pH reported in p.p.m.unless otherwise indicated.

| Sample Point No. | Lab. No. | 5 Day B.O.D. | Solids Total | Solids Susp. | Solids Diss. | Turbidity Silica Units | Bacteriological Laboratory Lab.No. | M.F.Coliform Count/100ml. |
|---|---|---|---|---|---|---|---|---|
| 25 | R4157 | 2.8 | 170 | | | 1 | R10042 | 82 |
| 26 | R4158 | 2.4 | 176 | | | 1 | R10043 | 77 |
| 27 | R4159 | 2.6 | 178 | | | 1 | R10059 | 70 |
| 28 | R4160 | 2.7 | 182 | | | 1 | R10060 | 36 |
| 29 | R4161 | 1.7 | 182 | | | 1 | R10061 | 89 |
| 30 | R4162 | 2.4 | 188 | | | 1 | R10062 | 102 |
| 31 | R4163 | 2.1 | 182 | | | 1 | R10063 | 84 |
| 32 | R4164 | 2.3 | 168 | | | 1 | R10064 | 102 |
| 33 | R4165 | 1.8 | 152 | | | 1 | R10065 | 63 |
| 34 | R4166 | 2.3 | 170 | | | 1 | R10066 | 71 |

| | | |
|---|---|---|
| 25 | R4157 | Upstream from Iroquois S.T.P. |
| 26 | R4158 | " " " " |
| 27 | R4159 | " " " " (Control Dam) |
| 28 | R4160 | " " " " " " |
| 29 | R4161 | " " " " " " |
| 30 | R4162 | " " " " (Canal) |
| 31 | R4163 | " " " " " |
| 32 | R4164 | " " " " |
| 33 | R4165 | " " " " |
| 34 | R4166 | " " " " |

# RIVER SURVEY

Watercourse: St.Lawrence River

Date Sampled: Dec.7 '60

All analyses except pH reported in p.p.m. unless otherwise indicated.

| Sample Point No. | Lab. No. | 5 Day B.O.D. | Solids Total | Solids Susp. | Solids Diss. | Turbidity Silica Units | Bacteriological Laboratory Lab.No. | M.F.Coliform Count/100ml. |
|---|---|---|---|---|---|---|---|---|
| 35 | R4167 | 2.2 | 170 | | | 2 | Broken in transit | |
| 37 | R4168 | 1.5 | 188 | | | 3 | R10067 | 117 |
| 38 | R4169 | 2.6 | 182 | | | 2 | R10068 | 53 |
| 39 | R4170 | 2.6 | 186 | | | 2 | R10069 | 15 |
| 40 | R4171 | 2.5 | 186 | | | 3 | R10070 | 58 |
| 41 | R4172 | 2.5 | 216 | | | 3 | R10071 | 500 |
| 42 | R4173 | 2.4 | 206 | | | 1 | R10072 | 3900 |
| 43 | R4174 | 2.5 | 192 | | | 1 | R10073 | 7200 |

| | | |
|---|---|---|
| 35 | R4167 | Upstream from Iroquois S.T.P. |
| 37 | R4168 | " " " " |
| 38 | R4169 | " " " " |
| 39 | R4170 | " " " " |
| 40 | R4171 | " " " "(Galop Canal) |
| 41 | R4172 | " " " " " " |
| 42 | R4173 | " " " " " " |
| 43 | R4174 | " " " " " " |

## RIVER SURVEY

Watercourse: St.Lawrence River

Date Sampled: Dec.7/60

All analyses except pH reported in p.p.m. unless otherwise indicated.

| Sample Point No. | Lab. No. | 5 Day B.O.D. | Solids Total | Solids Susp. | Solids Diss. | Turbidity Silica Units | Bacteriological Laboratory Lab.No. | M.F. Coliform Count/100ml. |
|---|---|---|---|---|---|---|---|---|
| 44 | R4175 | 2.0 | 178 | | | 1 | R10074 | 2900 |
| 45 | R4176 | 2.0 | 180 | | | 1 | R10075 | 200 |
| 46 | R4177 | 2.5 | 178 | | | 1 | R10076 | 95 |
| 47 | R4178 | 1.7 | 180 | | | 1 | R10077 | 81 |
| 48 | R4179 | 2.0 | 180 | | | 1 | R10078 | 4300 |
| 49 | R4180 | 2.6 | 182 | | | 1 | R10079 | 200 |

| | | |
|---|---|---|
| 44 | R4175 | Upstream from Iroquois S.T.P.(Galop Canal) |
| 45 | R4176 | Upstream from Iroquois S.T.P. |
| 46 | R4177 | " " " " |
| 47 | R4178 | " " " " |
| 48 | R4179 | Galop Canal(20 yards above Cardinal North S.T.P.) |
| 49 | R4180 | St.Lawrence River in vicinity of outfall from Cardinal South S.T.P. |